The Imperial Forestry Institute University of Oxford

TWENTY-EIGHTH ANNUAL REPORT

1951-52

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THE IMPERIAL FORESTRY INSTITUTE

Drawn by Alan Course, 1953

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UNIVERSITY OF OXFORD

TWENTY-EIGHTH ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE ACADEMIC YEAR, 1951-52

Students. The number attending throughout the year was 47. In addition, 5 Forestry Officers (Gold Coast, Uganda, Nigeria, Trinidad and Sudan) attended a special aerial survey course during the Michaelmas Term. Two other students were deputed by the Colonial Office to study tropical ecology, and divided their time between the Departments of Agriculture, Botany and Forestry. The Silviculturist from the Agricultural Research Institute, Wad Medani, Sudan, also attended lectures during Michaelmas and Hilary Terms. One German student from the Forestry School of Göttingen (at Münden) worked in the Department during Michaelmas Term. Nine students successfully sat for the Final Honour School of Forestry, the Classes obtained being two First, three Second, one Third, and three Fourth. Of these graduates, one Ceylon Government Scholar took up a post in the Forest Service of his country; similarly, a Gold Coast Government Scholar has returned to take up a post in the Gold Coast Forest Service, and one Colonial Forestry Scholar has returned to Uganda. Two of the others obtained posts with the Colonial Forest Service, one with the Forestry Commission, one has a temporary post with the Forestry Commission, and two have gone into private forestry.

There were 16 students in the junior year.

The Colonial Forest Officers' course was attended by 16 Forest Officers, coming from Nigeria (5), Gold Coast (2), Sierra Leone (1), Tanganyika Territory (2), Northern Rhodesia (1), Uganda (1), British Guiana (1), Trinidad (1), Fiji (1), Sarawak (1). One Forest Assistant from Nigeria attended the course.

Only one Indian Forest Officer (Bengal) and one Pakistani Forest Officer (Punjab) attending the course arranged for them.

Research Students. One student was awarded a B.Sc. degree on a thesis entitled 'Some aspects of the interaction between grass growth and tree seedlings.' One student was awarded the Diploma in Forestry on a thesis entitled 'The Progress of Oak and Ash Seedlings through their first and second years respectively.'

Prizes. The Schlich Prize for the best all-round officer attending the post-graduate course was awarded to D. Moore, Trinidad.

Instructional Tours. (1) *The introductory tour in Britain* for students about to start their forestry course and for those overseas students not familiar with British forests and forestry, was made just before Michaelmas Term. The tour was started off by the Professor

and Colonel Lloyd, and completed by Mr. Edwardson and Dr. Jones. The private estate visited this year was Eastnor, the property of the Eastnor Castle Estates Co., where they were shown round by Mr. R. W. V. Palmer.

(2) *Western France.* Sixteen first year students, together with four officers from India, Pakistan, Nigeria and Australia paid the usual visit to the forests of Normandy and the Landes; the tour was conducted by Dr. Jones and Mr. Edwardson.

(3) *Eastern France and Switzerland.* As an experiment, this tour was made this year during the Easter vacation, instead of at the customary time in June. The senior group of students, numbering 10, took part; they were joined in Switzerland by seven others, from Australia, India, Pakistan, Ceylon, Uganda (the Forest Engineer), and Tanganyika Territory.

(4) *Postgraduate tour in Great Britain.* The Colonial Forest Officers made a short tour with Mr. Edwardson to Lake Vyrnwy forest, Mortimer forest and Forestry Commission experimental areas in Monmouthshire. By kind permission of Sir Richard Cotterell, the woodlands of Garnons, Herefordshire, were also visited.

(5) *Denmark.* The Professor, with Colonel Lloyd and Mr. Edwardson, led a two weeks' tour of Danish forests. Thanks are due to Mr. Ulrich, the Director of the Danish State Forestry Service, who arranged the tour, and to Mr. Frølund, who was deputed by him to accompany the party. Thanks are also due to Dr. Larsen, and the many forest officers who helped to make the tour a success, to the owners of private woodlands and mills, and to Aarhus Municipality for their hospitality.

Working Plans. The practical work was again carried out in the New Forest, the students staying at the Forestry Commission hostel, Northerwood House.

Utilisation Course. The course for senior students at the Forest Products Research Laboratory was, as in previous years, arranged for the Christmas vacation. Special thanks are due to the Director for the arrangements made, and to those of the staff who gave demonstrations, etc.

Vacation Practical Work. During the long vacation, five students were employed by the Forestry Commission in the Cheviots and at Thetford, thanks to the co-operation of the Conservators and District forestry staff concerned. One student was employed in the Windsor Estate forests by arrangements kindly made by Colonel E. H. Savill. Ten students were employed by Messrs. Wm. Mallinson & Sons Ltd., during the Christmas and long vacations, on the grading and stock-taking of timber at various timber depots in the vicinity of London. Arrangements were made for one student to be employed at the Forestry Commission Research Station at Alice Holt, during the long vacation. Two students worked in Norway for three weeks by arrangement with sawmilling companies, and one student was employed for six weeks in Austria, under the Arlberg Forestry Department.

Excursions. Excursions were made with the senior and post-graduate students during the summer term to the British Railway Workshops at Swindon, the sawmills of Messrs. W. W. Howard Bros. & Co., Southampton, and the wood preservation plant of Messrs. Burt, Boulton & Haywood, also at Southampton, to Messrs. Hunting Aerosurveys Ltd. at Boreham Wood, to Windsor Forest and to Bathurst Park, Cirencester. The postgraduate students also visited Alice Holt Research Station and furniture factories at High Wycombe.

The junior year visited local woods mainly to study soils and silviculture with Dr. Jones and Mr. Edwardson: Wytham Wood was very convenient for these purposes.

Thanks are tendered to all those who kindly gave facilities for these useful visits and to those who showed our parties over woods and works.

Discussions. Fifteen open discussions of forestry topics of general interest were organised for the Colonial Forest Service officers under the leadership of each in turn. Short papers were read on selected topics during Trinity Term, each member taking his turn, followed by questions and general discussion. The latter procedure was also adopted for the senior undergraduate year, the papers being usually on the special subject each was studying.

Seminars in Tropical Silviculture. During the second half of Trinity Term seminars were arranged, and the discussions proved very helpful.

Visiting Lecturers. As usual, a series of lectures was arranged, primarily for the postgraduate course, which dealt with special aspects of forestry problems not expressly covered by the staff of the Institute. Specialists in selected subjects were invited to give a lecture, and to deal with the questions arising from it. Among the subjects dealt with this year were: weed control, soil fauna, problems of land use survey in the tropics, erosion and soil conservation, marketing of Colonial timbers, private forestry in Great Britain, costing in the sawmill, forest tree breeding and genetics, forestry activities of the Colonial Development Corporation, insecticides and their possibilities for use against insect pests on forest trees, primitive man in relation to the forest, pulp industry in connection with tropical forests, problems of game conservation in relation to forestry, timber pests, problems and progress in development of African peasant agriculture. The Department is much indebted to the specialists who kindly agreed, often at considerable inconvenience to themselves, to come to the Institute to give these lectures and deal with questions afterwards.

Assistance from other Departments. In the preceding year the Commonwealth Forestry Bureau undertook, as an experiment, to instruct a limited number of post-graduate forest officers in documentation, on the basis of the Bureau's own work. Two such courses, each lasting a week, were held during that year and were attended by nine officers in all. In the present year pressure of work at the Bureau has made it impossible to hold more than one course. This

was attended by six officers from Sierra Leone, Gold Coast, Tanganyika, Fiji and Sarawak, though many more would have been interested if it had been possible to arrange courses for them. The classes are taken systematically through every phase of documentation and end by tackling an actual enquiry. The course not only gives them knowledge useful to their own work in their Forest Departments, but also enables them to make the best use of the combined bibliographical facilities of the Institute Library and the Bureau during their studies at the University.

The Department of Surveying and the Soil Science Laboratory have continued their special courses for forestry students, and the Department is also much indebted to the Readers and their staff for help with the work of individual students. The Department is also much indebted to the Lecturers in Colonial Agriculture and in the Design and Analysis of Scientific Experiment for courses of lectures given to the senior year and postgraduate students. The Reader in Animal Ecology also gave a course of lectures in forestry aspects of his subject.

Assistance given to other organisations. The Professor gave a course of lectures on Colonial Forestry to the Colonial Administrative Service Cadets at Oxford and also at Cambridge University, as in previous years.

Tuition. Arrangements for individual tuition were continued with minor modifications, individual members of the staff supervising the work of students from groups of two or three Colleges, as well as that of all students for the appropriate branch of forestry.

Library. During the year it has at last been possible to work through the large accumulation of duplicates and gift material, so that practically all material is now satisfactorily organised.

Staff Tours. During the year under review, the Professor has been called upon to undertake an unprecedented amount of travelling. At the request of the British Council, he undertook an extended lecture tour of India, Pakistan and Ceylon, arriving in India in time to take part in the Eighth All-India Silvicultural Conference in Dehra Dun. He returned in April, and left again in May to take part in a rapid tour of German forests, as one of a small party of British foresters invited by the Minister of Food, Agriculture and Forestry of the Federal Government. The group was led by his Grace the Duke of Buccleuch and conducted by Ministerialrat Graf von Recke. This was of the nature of a return visit for that made to the United Kingdom by a group of German foresters two years earlier. Towards the end of the year under review, he went to Canada as the University representative to the Sixth British Commonwealth Forestry Conference. Mr. W. R. Day paid a visit to New England in the summer of 1951 where he was able to see some of the research work being undertaken into pathological problems. He also went to British Columbia in mid-April 1952, to carry out a summer's field work in the coastal forests. At the request of the President of the International Conference of Agricultural Economists, arrangements were made to permit

the attendance of Mr. J. J. MacGregor at their meeting at East Lancing, Michigan.

Research Field Station. The Yorkshire station at Wykeham has been used frequently by members of the Research Staff, particularly by Dr. Dimbleby and Mr. Rennie, though facilities were much reduced by lack of electricity which it had been hoped to link up. Acknowledgment is again made of the efficient help so willingly given by the Research Forester, Mr. Weatherell, in that area.

Scientific Societies, etc. Members of the staff have been active on the councils and committees of numerous societies as in former years, particularly the forestry societies.

Government Committees. The Professor continues to serve on the Forestry Commission's Research Advisory Committee, and on the Colonial Office Committee for Colonial Agricultural, Animal Health and Forestry Research. Both the Professor and Mr. N. V. Brasnett serve on the Colonial Office Forestry Committee. Colonel A. H. Lloyd continues to serve on the Forest Products Research Board (Department of Scientific and Industrial Research). Mr. J. J. MacGregor is serving on the Working Party of Forestry and Agriculture of the Government Technical Committee on National Resources. He is also a member of the Oxford and Bucks Divisional Committee of the Royal Forestry Society and of the Executive Committee of the Agricultural Economics Society.

The New Building. Many requests from University Societies for the use of the Joint Lecture Theatre during term time, for meetings, have been received, and facilities have been given for various organised forestry and connected activities. There has been further delay over the provision of the glass houses, and it will not be possible to start work on them till next year. Dr. Chalk and Dr. Handley continued to deal with the numerous adjustments, etc. still required in furnishing and equipment, including the use of the timber gifts from India and Ceylon.

Senior Staff. During the year under report, we have lost the services of two senior staff members; Dr. R. N. Chrystal who had been with the Institute since 1925 retired, and Dr. M. L. Anderson migrated to Edinburgh University, where he had been appointed to the Chair of Forestry. Dr. Chalk was also absent a good deal of the year through illness. Mr. B. J. Rendle, of the Forest Products Research Laboratory, kindly undertook Dr. Chalk's lecturing during Michaelmas Term, 1951, and agreed to do so again this year, if necessary. The Institute is greatly indebted to Mr. Rendle and to the Director of the Forest Products Research Laboratory, that courses in Wood Anatomy could be continued.

Technical Staff. There are now eleven technical assistants for the eight laboratories, apart from the workshop staff of three and the Photographic and Artist's Sections also with three. Willing and efficient service has been rendered by all during the year.

Secretarial Staff. There have been no changes in the staff during the year, during which the staff has worked loyally and enthusiastically.

WYTHAM WOODS

Instruction and demonstrations in several branches of forestry were given in the Woods, particularly forest engineering, entomology and practical silviculture for which they are particularly suitable. 'Dedication' has now been completed and the woods were worked according to the prescriptions of the third year of M. L. Anderson's Working Plan though it has not yet proved possible to complete the full programme. The chief item in arrears is in the coppice woods, though some of the thinning is also somewhat behindhand; the cause has been labour shortage. It is intended to purchase a tractor with winch in the coming year to reduce the manual work to be done. The nursery is being shifted to a new site on the edge of the Woods, adjoining the Forester's house. Under Colonel Lloyd's supervision, the Forester has continued to run the work with keenness and competence: the labour strength employed is four men.

BAGLEY WOOD

The process of Dedication is not yet completed as the Forestry Commission asked for reconsideration of two prescriptions of the draft working plan. They wanted in effect a shorter conversion period than proposed disregarding the hiatus which would occur at the end of it when all large timber of the old crop had been felled and the new crop was still immature. Their reason is the often inferior quality of much of the old crop and the desirability of replacing it and securing full stocking more quickly. If this can be done, it will help overcome a practical difficulty that is being experienced in that the small amount of felling permitted does not free an area big enough to make the prescribed area of plantation.

KENNINGTON NURSERY

This continues to be used by the Forestry Commission for research work with a wide series of investigations in progress, notably on the maintenance of fertility by use of artificial manures, grass leys and green crops, poplar cultivation, vegetative propagation of difficult species, chemical weed control, etc. The nursery is most useful for instructional purposes and as in previous years, the Institute owes much to Mr. W. G. Gray for his continuous help and able demonstrations to students and professional visitors.

SILVICULTURE

During the academic year 1951–52 the usual courses have been given by Dr. E. W. Jones in Silviculture and Forest Ecology. Practical work was done in Bagley and Wytham Woods and other woods in the neighbourhood. Instruction was given on tours in France and Switzerland.

Work has been continued on the material collected in the tropical rain forests of Nigeria in 1947–8, and is now nearing completion.

A Diploma student made a study on the destruction of acorns and of ash seedlings by animals in Wytham Woods.

The Professor gave a course of lectures on Tropical Silviculture and seminars were organised for the postgraduate students on Natural and Artificial Regeneration.

ECOLOGY

A joint course of lectures was given by Dr. E. W. Jones (general, and wet tropics) and Mr. A. C. Hoyle (dry tropics). Dr. G. W. Dimbleby gave a course of lectures to the postgraduate students.

There is little fresh to report on the past year's research by Dr. G. W. Dimbleby in the ecology of heathlands and woods, since this work has entered on a developmental phase preparatory to an extended programme of field work. Attention has been concentrated on the perfection of new techniques relating particularly to the investigation of the mull-mor equilibrium and the field measurement of soil water. Pollen analysis of mineral soils (as opposed to peats and sediments) which has been used with success on heathlands, is being developed with a view to using it to elucidate the history of a wider range of site types.

Field trials of hardwood sowings on moorland soils, carried out in N.E. Yorkshire in conjunction with the Forestry Commission have continued, and so far have produced very promising results.

Tree Physiology. A course of lectures was given by Dr. L. Leyton in Tree Physiology and Soil Biology, and he continued his research work on nutrition and growth in heathland plantations.

Most of the laboratory and field work connected with the current investigations into the mineral nutrition and growth of spruce and pine in heathland plantations has now been completed and much time has been spent on a statistical analysis of the data collected. Results to date confirm that the checking of spruce on these heathland sites is primarily due to a nitrogen deficiency induced by the presence of the heather. When the heather is removed by 'screefing' or suppressed by mulching, there is a marked improvement in the appearance of the trees and a significant rise in the dry weight and nitrogen status of the needles. A response in growth, however, did not occur until the year following these changes, when it was found that for trees of comparable height, those on the screefed plots had put on an average of about 6 in. more leader growth than trees on the non-screefed plots. It would appear that an application of a phosphatic fertiliser, though increasing the phosphorus status of the needles, does not stimulate height growth until this deficiency in nitrogen is overcome. On the non-screefed plots there was little response to the fertiliser, but where the heather had been removed, there was a significant increase in leader growth with increasing applications of fertiliser up to about 3 ozs. of ground mineral phosphate per tree.

Beyond this level there was no further appreciable increase in leader growth. It would also appear, in the Yorkshire plantations at least, that the phosphatic fertiliser itself leads to improvements in the nitrogen status of the trees. Both the removal of the heather and the applications of fertiliser also result in other changes in the composition of the needles, *e.g.*, in their potassium, calcium and manganese status, but the exact significance of these changes has not yet been evaluated. Despite the differences between the Yorkshire and Scottish sites, there was little fundamental difference in the nature of the tree response to the two treatments, though on the latter site the response was more gradual. The investigation is now being written up with a view to publication.

Investigations still continue into the nutrient status of *Calluna* as a guide to the fertility of these heathland sites, and with the co-operation of the Forestry Commission sampling has been extended to the Cornish heaths. Results to date suggest that besides site conditions and time of sampling, the age of the *Calluna* has also to be taken into account if comparisons between one site and another are to be valid.

A certain amount of research is being conducted into improved analytical procedures, particularly those involving the flame photometric technique.

Microbiology. During the past year a considerable amount of Dr. W. R. C. Handley's time has been occupied in preparing an account of work which has been carried out to find the reasons for the differential development of the mull and mor types of soil. Experimental work has continued on various aspects of this problem, which have been described in previous reports.

Attention has been paid to the detection and isolation of litter and, or wood destroying fungi, occurring in forms other than sporophores, from mull and mor. The trial of a number of substances as selective inhibitors has not so far yielded anything more useful than α-naphthol; the use of potassium tellurite in addition to α-naphthol allows of the selective inhibition of bacteria which had proved troublesome contaminants. In the case of many of the substances investigated as possible differential inhibitors, the boundary of differential inhibition appears to be so small that if the inocula containing wood and litter destroying fungi are able to withstand and modify the inhibitor, then contaminants rapidly overgrow wood and litter destroying organisms. So far, attempts to use various materials as sole carbon sources have not yielded encouraging results. The most promising line of approach at present, especially in the case of mull soils, seems to be to bury small pieces of sterilized wood or litter in the soil until microbiological ecological succession to the wood and litter destroying fungi has taken place when isolation of these organisms on α-naphthol plates seems possible. The production of a colour change in the presence of α-naphthol has been taken in the first instance to be an indication of the possible presence of a white rot type of fungus. There seems, however, to be some doubt as to the constancy of the correlation between the purple colour produced in the presence of α-naphthol and white rot character-

istics of an organism. Although organisms producing a white rot on sawdust have been isolated from soils, it has not yet been possible to establish their identity.

SOIL SCIENCE

As last year, the Reader in Soil Science, Dr. E. W. Russell, and Mr. G. R. Clarke, gave special undergraduate courses of lectures for forestry students, and Dr. Russell also gave a course on tropical soils.

Mr. P. J. Rennie continued his research work on some of the physical and chemical properties of moorland soils. Particular attention has been paid to porosity and aeration variations with soil type, season and method of cultivation, and their relation to the rooting of trees and *Calluna*. The work has reached a stage where analysis and interpretation of the accumulated data will for the time being take precedence over field work.

A new experiment has been commenced involving the application of ground limestone to variously cultivated moorland using both Sitka spruce and sessile oak. Investigations on base exchange and phosphorus relations have been facilitated by the appointment of an additional technical assistant. A special study of the historical maps and records for the area has been made with illuminating results, the best plantations being on former arable land or previous plantations.

Mr. Murphy is continuing at Rothamsted Experimental Station the studies of the moorland mesofauna that he began at the Institute, and this line of work is no longer in progress at the Institute.

FOREST BOTANY

Mr. A. C. Hoyle continued as Curator of the Forest Herbarium which was transferred, in October 1951, from the old Forestry building to the new Department of Botany linked with the Imperial Forestry Institute. Most of the time of the staff was occupied during the summer vacation in preparation for this move, and the refitting of the herbarium continued for some months afterwards so that stability has only very recently been achieved. In these circumstances it is perhaps fortunate that new accessions during the year totalled only 823 specimens (against 1,441 last year), including 83 duplicates from the East African Herbarium and 61 from the New York Botanic Garden. In spite of various delays, 1,005 specimens were poisoned and mounted and many more filed.

Teaching. Mr. Hoyle gave the usual courses in Systematic Botany and supervised the research of two colonial officers, one working on *Mimosaceae* and the other preparing a systematic botany handbook for the Northern Rhodesian Forest School.

Research and advisory work. Mr. Hoyle continued his study of *Brachystegia*: his revision for the *Flore du Congo* is now in final proof. A visit to Brussels in October 1951 for the first plenary meeting of the *Association pour l'Etude taxonomique de la Flore de l'Afrique tropicale* gave an opportunity for checking details with the editors

and artists and was also the occasion of much fruitful collaboration, notably in the family of *Caesalpiniaceae*. An invitation was extended to the Association to hold their 1953 conference in Oxford.

In the absence of Mr. F. White, Mr. Hoyle undertook the botanical advisory work which he was doing for the Hardwoods List of the British Standards Institution. Continuing his special connection with the Anglo-Egyptian Sudan, Mr. Hoyle had the help of Mr. J. K. Jackson of the Sudan Agricultural Research Institute, in naming the large collections sent in by him during the previous two years. Regular visits were made by Mr. R. W. J. Keay of the Nigerian Forest Department, who is working at the Royal Botanic Gardens, Kew, on a revision of the Flora of West Tropical Africa, and joint research has proceeded on a number of difficult genera. Dr. F. R. Irvine is using the herbarium in the preparation of his *Woody Plants of the Gold Coast,* and seeking advice at intervals. Mr. J. Wyatt Smith of the Malayan Forest Department has removed a large quantity of material, unwanted here, to make good damage in the Malayan Forest Herbarium.

Identification and Check-lists. In their work on the Northern Rhodesian Check-list, Messrs. F. White and A. Angus made notable progress on the preliminary study of many families before the former left for Northern Rhodesia in December; Mr. Angus followed him in July. They are now making an extensive study of the flora of the country and collecting widely as well as intensively. Before leaving, Mr. White finished editing an Institute Paper on the *Patana Grasslands of Ceylon* by Dr. C. H. Holmes. The editing of Mr. Fanshawe's paper on the *Forest Types of British Guiana* was completed by Mr. Angus.

Identifications sent out during the year by all academic staff totalled 788, exceeding those received for identification. These (709 in all) came mainly from the Forest Departments of Southern Rhodesia (235), Northern Rhodesia (125), Uganda (39), Anglo-Egyptian Sudan (39), Gold Coast (90) and New Guinea (124).

FOREST PATHOLOGY

Mr. W. R. Day continued in charge of this Section, with Mr. F. H. Jones as senior assistant, and Mr. D. K. Barrett and Miss J. Rose as junior assistants.

Teaching. The usual courses of instruction were given for the Honour school and the special short course in forest hygiene for the postgraduate students.

Research. Visit to New England in Summer 1951. Mr. Day made a prolonged visit during the summer vacation to New England. The greater part of this time was spent in the forest in central and northern New Hampshire, but opportunity was taken to discuss problems of current interest at Yale University with Professors Boyce and Lutz, and with the staff of the New England Forest Experimental Station at New Haven.

Beech diseases. Attention was paid to diseases of the eastern American beech, *Fagus grandifolia* which, in the region under observation, does not yet show infection by the species of *Nectria* which follows infestation by the sucking insect, *Cryptococcus fagi.* The study showed that there were two principal aspects to disease in regard to beech: the one was clearly related to site fertility: the other took the form of bark necrosis and possibly may have a climatic origin. Close observation showed that neither *Cryptococcus* nor *Nectria* were connected with either aspect. The aspect of disease related to site fertility takes the form of a thinning of the crown followed ultimately by the death of the head of the tree. This seems clearly to be related to inadequacy in soil conditions for the needs of the trees. The bark necrosis observed affects principally the main stem and is very similar to injury which occurs on European beech.

Butt-rot in Spruce and Balsam fir. An opportunity occurred to visit an extensive area in the southern limit of the Acadian forest in northern New Hampshire, being felled for pulp wood. The principal species represented were Red spruce (*Picea rubra*), Balsam fir (*Abies balsamea*) and Yellow birch (*Betula lutea*). Butt-rot was common in the conifers and especially in the Balsam fir, the more common species by far. The occurrence of abundant butt-rot in this type of forest has been reported previously on a number of occasions, and it seemed likely that similar soil conditions to those which so often prevail in this country, in association with butt-rot, must occur there. The logging roads, newly cut, provided extensive and continuous soil profiles for examination. The soils so exposed consisted of loams, at their best of good type, which were never of more than moderate depth and overlay a compact subsoil showing marked impedence in drainage. The wetness of a site depended largely on the nearness of this compact material to the soil surface. On the whole, the less well-drained the soil, as determined by this, the greater was the abundance of Balsam fir: the chance of finding large old growth Red spruce, Yellow birch, maples or thickets of hazel increased with increasing depth of well-drained loam. The generally prevailing soil drainage conditions are entirely consistent with what has often been observed in this country in connection with butt-rot.

Opportunity was also taken to study various other matters of interest, *e.g.* the structure of the Northern Hardwood-Hemlock forest; the dying of Paper birch (*Betula papyrifera*) and the chestnut blight disease caused by *Endothia parasitica,* which is still common in places on coppice growth.

Beech bark necrosis. The work on this has continued: the field work in Bagley Wood has been in charge of Mr. D. K. Barrett, assisted by Miss Rose. Observation of the dying of bark around necrotic areas has now been carried on sufficiently long to know that this is a seasonal phenomenon in the area under observation. There is a completely dormant period which begins about the end of October and continues until the late winter (probably usually some time in February). Freshly dead areas may then be observed: they gradually

become reduced in abundance and disappear about the end of June or the beginning of July. A dormant summer period then ensues which terminates some time in September.

Specimens examined from the area under observation show that the initial and most considerable dying of bark took place at the end of the winter in 1947—one of the most severe winters on record. This observation together with other similar observations recorded on beech on the continent of Europe seems to make it plain that severe late winter frost at least acts as an initiating factor in this disease. Many of the injuries are quite similar in appearance to those observed on beech (*F. grandifolia*) in New England and noted above. Extensions of injured areas since 1947 have nearly always been of slight extent. Other material collected elsewhere indicates that severe drought may also act as an initiating factor. It is plain that much further observation is needed in regard to the development of disease of this type on beech.

Isolations from freshly dying bark, attempted throughout the year, show that a complex flora is associated with this bark necrosis and that no one organism is consistently present: sometimes none are present and the tissue is sterile. Both bacteria and fungi occur. Much further investigation of this aspect of beech bark necrosis is also needed and observations within a new area are proceeding.

Observations of bark infested by *Cryptococcus fagi* show that eventually dead tissue always occurs in any part subject to feeding by the insect, as has already been recorded in North America and elsewhere. Isolations attempted from tissue still bearing live insects showed that the tissue sucked was infected: three different and as yet unidentified mycelia have been isolated in this way. It is not known how soon such infection occurs, or if it has any significance in relation to the insect.

Plate cultures made from swabbings taken from the surface of both uninfested healthy and infested beech bark revealed the presence of an extensive micro-flora among which were found two of the three mycelia isolated from infested bark. Streaks of crushed *Cryptococcus* on agar also developed a complicated flora among which one of the three isolated mycelia appeared. It would appear that the organisms which enter injured beech bark are surface inhabitants and this would account for the variety isolated in this work.

The anatomical investigation of beech bark necrosis and canker has proceeded sufficiently far to show it is of considerable interest: its further prosecution awaits the completion of other work.

Cambial injuries on Japanese larch, Norway and Sitka spruce. The investigation of the abnormal anatomy of these injuries has proceeded further and it is hoped to bring this shortly to a point when a record of the work can be published.

Mr. F. H. Jones made an investigation of their frequency in the field on Drummond Hill, in Norway and Sitka spruce. Spruce occurs in relatively small areas on this hill, these being situated in the wetter places and mainly on the northerly side. Transects taken through

sample areas showed that an appreciable proportion of trees could be affected to such an extent that dead areas of bark occurred. These dead areas are situated mainly on the lower bole and are associated with two types of injury. In the one case, the dead bark is left in position: this is the more common and important and is obviously not a mechanical injury. The other type, found on Norway spruce principally, is the result of deer rubbing the velvet off their horns.

The fungus flora of the main stem of standing trees. Samples received last year of Sitka spruce from Aberdeenshire, which had suffered from drought crack in 1947 showed general infection in the heart wood with *Fomes annosus*: the other fungus present was *Graphium penicillioides*. It was felt to be of some importance to know whether *Fomes annosus* was present over any wider area and, in order to obtain information regarding this, standing trees were sampled in Pitfichie Forest. The sampling was done by Pressler's borer at regular intervals along transects which passed through compartments in which drought crack had occurred: both cracked and uncracked trees were sampled: the principal species were Norway and Sitka spruce but a few Douglas fir were also examined.

This work, which was carried out by Mr. F. H. Jones, showed that, as sampled, all the cracked and most of the uncracked trees had heart wood infected with mycelia. These have not yet been identified, but *Fomes annosus* is not present and it is unlikely that most of the mycelia are active in wood destruction. Dark mycelia which produce the staining of timber were common. The points sampled in areas in which there were no cracked trees produced most of the sterile samples.

Examination of soil profiles at the points sampled showed that the occurrence of drought crack was associated either with only a shallow depth of soil permitting good root development, or with a subsoil which, though it permitted relatively deep rooting, was liable to become dry. On the other hand, absence of drought crack was consistently associated with a relatively good depth of abundant rooting combined with a subsoil of moist character. This is entirely in accordance with what has been observed previously.

European larch. It is hoped to finish shortly the proposed publication on the silviculture and pathology of European larch.

Work on the fungus ecology of the canker is yielding interesting results. Further field work is needed, but it appears that laboratory examinations will also be necessary and material for this is being collected. Part of the mycological difficulty lies in the identification of species, but progress is being made.

The relative susceptibility of strains of European larch to irreversible plasmolysis has been under preliminary trials at Drummond Hill. They were successful in that differences between known strains appeared in the order expected.

Other items. Valuable discussions have taken place with Mr. T. R. Peace and Mr. Murray of the Forestry Commission Research Staff and arrangements for further co-operation in field work have been made. The courtesy of the Forestry Commission Research and general

Executive Staff in aiding our field work, as always, has gratefully to be acknowledged.

Mr. Day proceeded to British Columbia in mid-April to carry out a summer's field work in the coastal forests and especially in relation to Sitka spruce. This work has mainly been made possible by the help of the British Columbian Forest Service to whom grateful acknowledgment is made.

The technical staff of the section have again given loyal and intelligent service. Mr. F. H. Jones has been in general charge of work during Mr. Day's absence.

FOREST ENTOMOLOGY

Mr. G. H. Thompson assumed charge of the section on October 1st, 1951, on the retirement, after 25 years service, of Dr. R. N. Chrystal. Mr. E. R. Skinner continued to give able assistance.

Teaching. Courses of instruction in Forest Zoology and Entomology were given during the Hilary and Trinity Terms, together with field demonstrations. An advanced course in Forest Entomology was presented for one student who chose this subject for his final examination and for two Colonial Forest Probationers as part of their Special Subject. Several visits were made to other establishments engaged on research of interest to the Forest Entomologist.

The inception of the advanced course in Forest Entomology necessitated considerable augmentation of teaching material and methods were standardised for dealing with wood specimens and wet and dry adult and larval insect material. The wet collection was transferred to a cabinet built in the Department's workshops. A reference collection of British forest insects was initiated.

Research. Progress was made in equipping the Department's room in the Wytham chalet as a field laboratory.

In order to obtain eventually information on the loss in girth increment resulting from different degrees of insect defoliation, a test was started concerning the best technique for recording radial increment using a dial-gauge dendrometer sensitive to 0.0005 inches.

An enquiry was begun into the ecological status of rotting wood, with particular reference to its possible value in providing hibernation sites for beneficial insects and any threat to living trees offered by insects breeding in this habitat.

MANAGEMENT

A course of twenty lectures in general forest organisation and planned management was given by Mr. N. V. Brasnett, supplemented by Mr. T. E. Edwardson in four lectures about the handling of British forests. A visit was paid to Normandy and the Landes to see the use of periodic blocks and area control in planned provision of major and minor forest products. Four weeks were spent in the New Forest describing, enumerating and stock-mapping 650 acres, and the descriptive part of a Working Plan was handed in by each student.

The development of current management practices and their future trends were discussed in twelve lectures by Mr. N. V. Brasnett, and the special problems of the United Kingdom were dealt with by Mr. T. E. Edwardson in four lectures. The students returned to the New Forest area for a fortnight to complete plans for the attainment of given objects of management. These plans were submitted to the examiners as part of the Final Schools. They were more detailed and complete than those which are so urgently required in most of the Commonwealth countries to-day, but it is impossible to effect satisfactorily the simplification and omissions suited to local conditions, until the experience of drawing up a fully detailed plan has been acquired.

In the tour in the French and Swiss Jura, the special problems raised by difficult conditions were studied as well as management under various silvicultural systems.

MENSURATION

The regular courses were conducted by Mr. T. E. Edwardson with practical work in Bagley Wood, including a full remeasurement of a sample plot of *Cedrus deodara*. Sixteen lectures on selected points in forest mensuration were given in the post-graduate course. Practical instruction was also given in connection with the preparation of working plans and on excursions and tours.

Mr. Edwardson acted for the Professor at meetings in Bagley Wood with representatives of the Forestry Commission. The Comission officers carried out an independent assessment of the existing productivity of the wood and suggested a speedier rehabilitation of the understocked areas. The plan prepared by Dr. Anderson is being amended to meet a number of proposals resulting from the discussions with the Forestry Commission.

He also advised college and other forest owners on the management of their woodlands and in co-operation with the Forestry Commission initiated a continuous inventory of the oak in the Forest of Dean which should provide data of considerable practical and theoretical interest. Contacts have been maintained with the Mensuration Branch of Alice Holt Research Station and valuable assistance has been given from time to time by Mr. Hummel.

STATISTICS

Mr. J. M. Hammersley gave a course of lectures on elementary statistics for Forestry students. Some students at the Institute attended Dr. Finney's seminars on Biometry.

Miss Smith has continued to carry out efficiently the computing work and there has been a steady demand for her services from several sections.

WOOD STRUCTURE

Dr. L. Chalk continued in charge of the section with Mr. A. A. Shaw and Mr. P. G. H. Franklin as assistants. Dr. Chalk was absent

during the Michaelmas Term owing to ill health and his formal teaching during that term was very kindly undertaken by Mr. B. J. Rendle of the Forest Products Research Laboratory, Princes Risborough.

Teaching. The usual undergraduate and post-graduate courses were given, the latter having been reorganised to include a course of lectures instead of seminars. One undergraduate undertook work in this subject for his special subject in the Honours School, and one forest officer made a similar study under the direction of Dr. Chalk, the practical work being done at the Forest Products Laboratory, Princes Risborough.

Research. (1) *Variation in the density of Douglas fir.* Dr. Chalk's work on this subject was much handicapped by his illness. One small investigation, however, was completed, in which it was shown that there appears to be no inherent variation with number of rings from the pith; in one tree, in which the rings were wide enough for individual density determinations, both ring width and density remained constant after the first three or four rings. The values obtained were almost identical with those obtained from comparable material with rings of one third to one half the width.

(2) *Shrinkage.* Following up the evidence obtained in the previous year by F. W. Lindsay and D. T. Carter of the influence of rays on the radial shrinkage of wood, R. V. Haden made a study of the shrinkage of blocks of wood from a large number of species within a botanically related group of families, including the *Meliaceae, Simarubaceae* and *Burseraceae.* He found a correlation between radial shrinkage and type of ray; the more heterogeneous types of ray, with relatively short procumbent cells, shrank more than woods with homogeneous rays. The relation did not hold for woods with uniseriate rays only; in these the influence of the rays appeared to be almost negligible. Deductions from these results suggest lines on which the apparent conflict between the hypotheses of Clarke and Frey-Wyssling may perhaps be resolved.

(3) *Mechanical strength of Cedrela timber.* D. Moore of the Forest Department of Trinidad, carried out an investigation of the comparative strengths of *Cedrela mexicana* grown under forest conditions and in cacao plantations. The tests were carried out at the Forest Products Research Laboratory, Princes Risborough, by kind permission of the Director. Owing to delay in the arrival of the material, the laboratory work was only just completed before Mr. Moore returned to Trinidad and the results have not yet been fully computed.

The Wood Collection. The principal additions to the wood collection were received from the Colonial Forest Departments of Fiji, Northern Rhodesia, Tanganyika Territory and Trinidad; specimens were also received from Mr. A. C. Hoyle, and M. D. Normand of the Centre Technique Forestier Tropical, Nogent-sur-Marne. Good progress was made with the sorting, labelling and indexing of material accumulated during and after the war, some 2,000 specimens being dealt with.

FOREST ECONOMICS

Mr. J. J. MacGregor continued in charge of this section, with Mr. F. E. Balman as his assistant. During the year the section has taken up the organisation of a survey into the costs of forestry on private estates in England and Wales. Mr. W. E. S. Mutch was appointed as a full time assistant on the Survey and Miss M. Jackson was appointed to undertake the secretarial duties.

Teaching. Courses of lectures and tutorials were provided for the Honour School of Forestry on general economic theory, forest economics, and British forest law, land tenure and taxation. Seminars based on study groups dealing with the main economic problems of individual colonies were arranged for the Colonial Forest Officers.

Research. The bulk of the time available for research has been devoted to organising the survey of private forestry costs. This has been made possible by a grant from the Forestry Commission. Over eighty private estates have been visited to make arrangements to receive a regular flow of economic data on the activities of the woodland departments. Although, for most of the estates, the arrangements do not involve material alteration in the estate office organisation, quite a large proportion have been prepared to introduce modifications in their office routine to meet the special requirements of the survey. As some estates have dedicated their woodlands under the Forestry Act of 1947, they have been prepared, in recasting their accounting systems, to make some additional analyses for the survey. It is proposed to select a representative sample, probably of about fifty estates, from the list of estates visited. To illustrate aspects of this survey, the Forest Economist gave a talk to a study course organised by the Royal Forestry Society at the Royal Agricultural College at Cirencester in April.

Other research work during the year has been concerned with economic aspects of the national forest policy, and with the world and European timber situation.

COLONIAL FOREST ADMINISTRATION

Mr. N. V. Brasnett continued to give the course in this subject which was also dealt with in several of the post-graduate discussions, including those on the training of subordinate field staff, the procurement of land for State and communal forestry, utilisation of savanna forest, the management and administration of communal forests, some marketing problems of secondary timbers, publicity and public education in forestry, introduction of local sawmilling industry, agricultural settlement schemes in relation to the forest, and town fuel supplies.

Eight candidates in the Honour School examination successfully offered this subject.

FOREST UTILISATION AND ENGINEERING

The usual courses of lectures, practical work and demonstrations were given. These include a road alignment and bridging. A course

of eight lectures was also given on forestry tools and equipment, and on methods of timber extraction and conversion.

Demonstrations were given at Wytham on logging and conversion with a portable mechanical drag-saw, and tree-felling by Trewhella Winch. A special lecture was given, and a film was shown, of timber extraction by portable winches combined with gravity cableways, as this type of extraction is now being used by many Forest Departments in Africa and elsewhere.

All forest officers and final year students attended a special course of lectures and demonstrations at the Forest Products Research Laboratory during the Christmas vacation. This course is of great value in keeping post-graduate students in touch with current research and utilisation problems, particularly in relation to the testing of tropical timbers. We have to thank the Director and staff for arranging this special course, which entails a great deal of work for the Laboratory research staff each year.

Timber yards and sawmills were visited at the British Railway depot at Swindon and at Messrs. W. W. Howard Bros. & Company's import mills in Southampton. Timber seasoning kilns were also seen in operation at these two centres. Modern methods of timber preservation were seen at Messrs Burt, Boulton & Haywood's new plant at Totton. A furniture factory was visited at High Wycombe and an estate sawmill at Windsor.

A special attempt has been made this year to bring the forest officers and students into closer contact with the timber trade and sawmilling. In addition to the visits to sawmills, talks were given by prominent representatives from the timber trade. These included Mr. Harold Wright, of Messrs. John Wright and Son, Redditch, Mr. Gordon Jacob, of Messrs. J. R. Gordon & Co., Chester, and Mr. J. L. Howard, of Messrs. W. W. Howard Bros., Southampton. The use of colonial timbers and the economics of sawmilling were dealt with during these lectures. A representative of the Timber Development Association gave a talk on the marine-uses of timber.

A special utilisation tour was arranged to Switzerland for seven forest officers and forest engineers from Australia, Tanganyika, Uganda, Nigeria, India, Pakistan and Ceylon. Extraction of timber from mountain forests were studied, especially the uses of winches for ground skidding and for high cable extraction. Sawmills and various forest industries were visited and a new training school for sawmilling and timber conversion was visited at Bienne. This is the first school of its kind and provides a complete course in sawmilling and woodworking.

In the Easter vacation, twenty forest officers and probationers visited the sawmills and wood industry plant of Messrs. J. R. Gordon & Co. at Chester, and afterwards visited this firm's extraction operations in North Wales, where new types of equipment for the handling and loading of timber were seen. We have to thank Mr. G. R. Jacob for kindly arranging these visits and for personally conducting the demonstrations in the forests. Colonel Lloyd also made the

arrangements for vacation practical work by the students as detailed on page 4.

Colonel Lloyd continued his studies of extraction of timber by modern mechanised cableways and during the long vacation visited installations in Austria and Switzerland. He has made a special study this year of the use of cableways in level country, and their adaptation for the extraction of mangrove bark from tidal forests. An experimental cableway was installed during the long vacation in Switzerland at the request of the firm operating in the mangrove forests of North Borneo. If this new system proves a success it may also have a very wide application to extraction of thinnings from plantations in level country. Experimental cable installations were visited in Scotland and discussions were held with the Forestry Commission in Scotland, where the installation of a standard Wyssen cableway for the extraction of thinnings is now proposed.

Colonel Lloyd continued to act as Liaison Officer between the Forestry Commission and the Food and Agriculture Organisation in respect of forestry machinery and equipment.

FOREST PROTECTION

A short course of lectures on fire protection and counter erosion work was given by Colonel A. H. Lloyd.

SURVEYING

Mr. A. R. Robbins, University Lecturer in Surveying, gave the usual course on surveying in the Trinity Term.

The usual course in aerial survey was given to the Forest Officers' course by Mr. A. R. Robbins and Dr. G. W. Dimbleby. In addition, a special course for officers not attending the Forest Officers' course was given in conjunction with the Directorate of Colonial Surveys. This was attended by five officers, and whilst covering the same ground as the regular course it was condensed into one term instead of covering three terms.

LIBRARY

Staff. There were various changes during the year, the chief being the resignation of Mr. Smythies, one of the two Assistant Librarians.

Accessions during the year:

The statistics are as follows, figures in brackets being those of the previous year:

Issues of periodicals	1,914	(1,734)
Books	266	(177)
Other items	1,655	(2,222)
Total	3,835	(4,133)

One book was purchased (3) through the Brooks Memorial Fund; the library was provided with 281 (327) items by the Commonwealth Forestry Bureau and with 258 (200) by other institutions and persons

Loans:

To Staff, direct, 266; by circulation, 2,642	3,308	(3,865)
To students	1,284	(1,109)
To the Bureau staff	459	(865)
To visitors and correspondents ...	634	(560)
Total loans:	5,685	(6,399)

New periodicals. Fourteen new periodicals were begun, one English, three from Austria, and one each from Belgium, Burma, Brazil, Czechoslovakia, Greece, Italy, Japan, Russia, Turkey, and the United States. Current periodicals now number about 260. several existing sets were completed, or partly so, by the acquisition of back numbers.

New Series. Sixty-eight new headings of Bulletins, Reports, etc., were established. The total number of current series is now about 1020.

Correspondence. Letters sent (including requests), 1860 (1367); received 1052 (1037). The statement in last year's Report, that the 'Agricultural Pool' receives all U.S. Department of Agriculture publications whence those of forestry interest are passed to us seems to have been based on misinformation; considerable direct requesting has consequently been resumed.

Sales. The total value of publications sold through the library direct or by post was £199. One transaction, the sale of Institute Paper No. 28 to the Ceylon Forest Department, accounts for £68 4s. 0d.; apart from this, the sales were chiefly for single items to separate persons or firms, the great majority by post.

Catalogue Room. Development of the Institute Catalogues continues under the newly introduced 'Oxford' classification scheme. Apart from a few minor adjustments, the year has been uneventful and has progressed with a smoothness unknown since the Catalogues were built up in 1946.

The rapidly expanding title service offered by the Commonwealth Forestry Bureau presents a problem yet to be solved. The reproduction of title cards which is done by the Library staff under an arrangement involving a convenient re-adjustment of duties between the two organisations would be considerably facilitated if an efficient reproducing machine could be obtained. Title service cards were sent out as follows: Fiji, 4,251; Finland, 3,010; Furniture Development Council, 2,869; New Zealand, 2,505; Pakistan, 1,681; India, 1,169; U.S.A. Wisconsin, 45 (lately begun); Forestry Commission Library, Alice Holt 2,188; F.A.O., 1,009; Princes Risborough, 3,522 (discontinued at the end of 1951).

Another record is reached with the 18,377 cards filed into the Indexes during the year.

The Assistant Librarian, Mr. Hemmings, has done much valuable work on the examination of material not yet incorporated in the library. This has included

(*a*) sorting many thousands of duplicates (books, pamphlets, reports, etc.) and distributing them to the appropriate staff members.

(*b*) examining donated works and where necessary incorporating them into the main library.

(*c*) returning unwanted series, pamphlets, etc. to Learned Societies and other institutions to whom they were likely to be of use.

(*d*) selecting works for the Forest Library at Abbotabad, Pakistan. Two large consignments were made over to Pakistan House, London.

(*e*) boxing old periodical series.

(*f*) segregating from duplicate stock sets of periodicals likely to be useful for lending purposes.

Maps. Heretofore little has been done to develop the map collection as no space was available. Mr. Dundas (C.F.S. retd.) prepared a catalogue which has already proved very useful.

The Library *Bulletin* continued to be issued at two monthly intervals.

Acknowledgments. The library has continued to be enriched by the kindness of numerous friends, among whom may be particularly mentioned Professor Houtzagers of Wageningen, whose gift of volumes 1-8 of the *Nederlandsch Boschbouw-Tijdschrift* completed our set of this periodical; Mr. H. R. Blanford, for a number of Spanish and other publications; the Editor of *The Sphere* for a preprint of an important article by Mr. Fraser Darling; Mr. H. C. Robertson for four interesting French maps; and Dr. G. W. Dimbleby and Dr. E. W. Jones for reprints of articles. Various institutions, especially the Forestry Commission, the Macaulay Institute for Soil Research, and the United States Department of Agriculture, are also thanked for gifts.

PHOTOGRAPHIC SECTION

During the past year the demands on the Photographic Section, although not so heavy as the previous year, during which photos were prepared for three exhibitions, included a total of 4,140 prints and enlargements. This figure is an increase of approximately 20% over the last normal year.

In addition to the usual miscellaneous processing of slides, etc., much work has been done on the preparation of a comprehensive card index system for the classification of the lantern slide collection.

Maintenance of projector equipment was taken care of by the section and conversion of the epidiascope in the small lecture room to higher power lighting made possible efficient projection facilities

in all the main lecture rooms. Duplicating work done by the section amounted to approximately 50,000 impressions including a number from photographic stencils. The section is staffed by Mr. H. P. Woodward and one assistant.

WORKSHOPS

The Workshops continued with two metal-workers, Mr. E. J. Howell and Mr. G. A. Jones, and one wood-worker, Mr. J. Howkins. Mr. G. A. Jones succeeded Mr. J. Hanson, who resigned during the year in order to take up a post in Australia.

The chief items constructed during the year were:

Metal-work

Flame Photometer (For routine analyses of Sodium, Potassium and Calcium in plant tissues).

Dendrometer (For measurement of radial increment in standing tree).

Eight Hypsometers (Measuring heights of standing trees).

Photo cell holders and reflecting plates.

Calibrator for porous pencils.

Wood-work

Herbarium storage cabinet (A storage cupboard for mounted specimens with a bank of 63 drawers, for the storage of mycological specimens).

Entomological specimens storage cabinet (Entomological spirit specimen storage cabinet consisting of 34 drawers with a total capacity of 1,632 tubes and 1 index drawer).

FINANCE

The audited accounts of the Department will be published in the *Oxford University Abstracts of Accounts*. The following is a summary of income and expenditure for the year.

General Account

Income. Forestry Commission, General Education, £5,610; Forestry Commission, Special Grants, £4,631. Colonies, £5,000; Colonial Development and Welfare Fund, £11,320; Colonial Office, Special Grant, £769; Curators of the University Chest, £13,584; Dominions, and others, £470; sale of publications, £199; other receipts, £349. Total income, £41,932.

Expenditure: Staff salaries and pension contributions, £33,011; instructional supplies, £2,039; furniture, £172; travelling, £2,188; general expenses, £1,287; Library expenses, £647; Publications, £221; 'Premises' expenses, £2,173. Total expenditure, £41,538.

Capital Account

There is held in the Capital Account the sum of £12,457. The income for the year from investments was £285.

APPENDIX I

PUBLICATIONS

GENERAL

Reviews

Gazetteer of Agricultural and Forestry Research Stations in the British Commonwealth, 1952, including a list of such stations in the Republic of Ireland. *Executive Council of the Commonwealth Agricultural Bureaux. Nature.* (*H. G. Champion*).

Administration Reports: Nyasaland Protectorate, 1951; Tanganyika Territory, 1950; Uganda Protectorate, 1950; *Empire Forestry Review,* Vol. 30: 80-81 and 162-163. (*N. V. Brasnett*).

SILVICULTURE

Original Publications

Some observations on the lichen flora of tree boles, with special reference to the effect of smoke, by E. W. Jones. *Revue Bryologique et Lichènologique,* Vol. 21: 96-115.

Natural regeneration of beech abroad and in England, by E. W. Jones. *Quarterly Journal of Forestry,* Vol. XLVI: 75-82, 1952.

Silvicultural Systems, by R. S. Troup. Second edition revised by E. W. Jones, April, 1952. (Oxford University Press).

Review

Silvicultural Systems, by R. S. Troup. Second edition revised by E. W. Jones. *Nature,* Vol. 170: 816. (*H. G. Champion*).

ECOLOGY

Original Publications

Pleistocene Ice Wedges in North-east Yorkshire, by G. W. Dimbleby. *Journal of Soil Science,* Vol. 3: 1-19.

The Root Sap of Birch on a Podzol by G. W. Dimbleby. *Plant and Soil,* Vol. 4: 141-153.

FOREST BOTANY

Original Publications

The grass, fern and savannah lands of Ceylon, their nature and ecological significance, by C. H. Holmes. Institute Paper No. 28. (Edited by F. White).

The vegetation of British Guiana—a preliminary review, by D. B. Fanshawe. Institute Paper No. 29. (Edited by F. White and A. Angus).

FOREST MANAGEMENT

Original Publications

Organisation of Sustained Yield Management in Previously Unmanaged Forests, by N. V. Brasnett. *Proc. Sixth British Commonwealth Forestry Conference,* 1952.

Planned Management of Forests, by N. V. Brasnett. In the Press. George Allen and Unwin Ltd., London.

FOREST MENSURATION

Reviews

Census of Woodlands 1947-1949: Summary Report (Forestry Commission Forest Record No. 3). *Forestry,* Vol. XXV: 70-71 (*M. L. Anderson*).

Survey of Tropical Forests for Production of Cellulose, by P. L. Quint, Bois et Forêts des Tropiques, 18/19, 1951. *Empire Forestry Review,* Vol. 30: 398-399. (*N. V. Brasnett*).

WOOD STRUCTURE

Original Publication

Water and the growth of wood of Douglas Fir, by L. Chalk. *Quarterly Journal of Forestry,* Vol. 45: 237-242.

Reviews

Identification of Hardwoods, A Lens Key. Forest Products Research Bulletin No. 25, pp. 121, 8 plates, 1952. *Empire Forestry Review,* Vol. 31: 334. (*L. Chalk*).

The periodicity of wood formation, by K. Ladeford. Det Kongelige Danske Videnskabernes Selskab, Biologiske Skrifter, Vol. 7: 98. In Press. (*L. Chalk*).

FOREST ECONOMICS

Original Publications

Estate Accounting and Forestry Costs, by J. J. MacGregor. *Quarterly Journal of Forestry,* Vol. XLV: 243-254.

European Timber Economy and International Organisations:

I. Supply and Demand, *Wood,* Vol. XVI: 350-352.

II. Long and Short Term Measures, *Wood,* Vol. XVI: 394-395.

III. The Technical Assistance Programme, *Wood,* Vol. XVI: 429-430.

The Political Economy of British Forestry (with discussion), by J. J. MacGregor. *Journal of Proceedings of the Agricultural Economics Society,* Vol. IX: 287-307.

Problems of British Forest Policy, by J. J. MacGregor. *Westminster Bank Review,* February 1952: 4-10. (Reprinted in the *Land Agents' Journal,* Vol. LI: 238-246.)

Reviews

Forestry Taxation in Europe and New Zealand, by M. B. Grainger *Empire Forestry Review,* Vol. 31 : 153. (*J. J. MacGregor*).

Taxation of Woodlands in England and Wales, by Cyril E. Hart. *Empire Forestry Review,* Vol. 31 : 155-156. (*J. J. MacGregor*).

Dartington Woodlands Limited. An Examination of the Accounts for the Years 1949-50 and 1950-51, by W. E. Hiley. *Quarterly Journal of Forestry,* Vol. XLVI: 208-210. (*J. J. MacGregor*).

FOREST UTILISATION AND ENGINEERING

Original Publications

Timber Extraction from Difficult Sites. The Use of Modern Cableway Systems, by A. H. Lloyd. *Wood,* Vol. 17: 218-220.

A new mechanised portable cableway for getting timber from difficult sites, by A. H. Lloyd. *Australian Timber Journal,* Vol. 18: 428, 430.

Getting timber from difficult sites, by A. H. Lloyd. *Public Works Engineers' Overseas Journal,* 1952.

Review

Forest Engineering: Roads and Bridges, by James L. Harrison. *Forestry,* Vol. XXV: 146-148. (*A. H. Lloyd*).

FOREST ENTOMOLOGY

Original Publication

Recent developments in the preparation of attack by Ambrosia (Pinhole borer) Beetles in standing trees and logs, by G. H. Thompson and R. C. Fisher. *Proc. Sixth British Commonwealth Forestry Conference,* 1952.

APPENDIX II

STAFF

I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH

PROFESSOR H. G. CHAMPION, C.I.E., M.A., D.Sc. (Oxon.). Tropical Forestry, Forest Policy.

L. CHALK, M.A., D.Phil. (Oxon.). Wood Structure and Properties.

W. R. DAY, B.Sc., M.A., (Oxon.). Pathology, Forest Hygiene.

A. H. LLOYD, O.B.E., M.C., T.D., M.A. (Oxon.). Forest Engineering and Utilisation.

G. H. THOMPSON, B.Sc., M.A. (Oxon.). Forest Zoology.

N. V. BRASNETT, M.A., Dip. For. (Cantab.). Forest Management.

T. E. EDWARDSON, M.A. (Oxon.), B.Sc. (For.) (Edin.). Mensuration.

J. J. MACGREGOR, B.Sc. (Glasgow), M.S. (Wisc.), B.Litt., M.A. (Oxon.). Forest Economics.

E. W. JONES, M.A. (Oxon.), Ph.D. (Cantab.). Silviculture.

W. R. C. HANDLEY, M.A. (Oxon.), Ph.D. (Leeds). Microbiology.

L. LEYTON, M.A. (Oxon), Ph.D. (Leeds). Tree Physiology.

G. W. DIMBLEBY, M.A., D.Phil. (Oxon.). Forest Ecology.

F. WHITE, B.A. (Cantab.). Forest Botany.

A. ANGUS, B.Sc. (Edin.). Forest Botany.

P. J. RENNIE, B.Sc. (Lond.). Soil Research.

II. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN INSTRUCTIONAL WORK

A. C. HOYLE, B.Sc., M.A. (Oxon.). Forest Botany and Ecology.

E. W. RUSSELL, M.A. (Oxon.), Ph.D. (Cantab.). Soil Science.

G. R. CLARKE, B.Sc., M.A. (Oxon.). Soil Science.

A. R. ROBBINS, M.A., (Oxon.). Surveying.

J. M. HAMMERSLEY, M.A., (Oxon.). Statistical Methods.

III. OTHER STAFF

Secretary: Miss H. M. EDWARDS

Assistant Secretary: Miss I. BLAGROVE

Accountant: Mr. A. A. ADAMS

Librarian: Miss G. GUINEY

Assistant Librarians: Mr. Y. SMYTHIES, M.A. (Cantab.).
Mr. E. F. HEMMINGS